The Interrelationship between Structure and Collective Actors: A Concept for a Dynamic-Reciprocal Model of Structural Change

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Robert Peters *

Abstract: *»Die Wechselbeziehung zwischen Struktur und kollektiven Akteuren: Konzept für ein dynamisch-reziprokes Modell strukturellen Wandels«.* The purpose of this article is to explain the emergence of a new practice (i.e., relocation) and the role of entrepreneurial groups in this emergence based on the revealing case of the early-modern needle industry in Germany. In the 18th century, Aachen became the leading location for needle production in the entire western world. The city's industrial rise was intrinsically linked to the emergence of an entrepreneurial group: A small group of needlemakers oligopolized the regional needle branch within a few years and created substantial competitive advantages for the production site. In order to analyze the reciprocity of structure and agency, I draw on Wolfgang König's agency-structure concept (ASC) and Paul Thomes' three-phase change model (TCM). I integrate both approaches into a dynamic-reciprocal model of structural change (DRSC). By doing so, I aim to amplify the concept of institutional entrepreneurship (IE).

Keywords: Entrepreneurial groups, structural change, agency, innovation, diffusion.

1. Introduction

Traditionally, entrepreneurial activity has been the focus of business history and the broad field of social sciences. For a long time, research on "entrepreneurs" concentrated on individual actors (Ruef 2010, 8). Particularly since the millennium, "research has looked beyond the individual more regularly" and scholars now focus on entrepreneurial groups as collective actors (Davidsson 2016, 20). Examining the interrelationship between established economic and societal structures and entrepreneurial groups by referring to the principle of the social construction of society is particularly interesting (Giddens 1984).

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How do entrepreneurial groups behave under the influence of particular structural circumstances? And what is the role of entrepreneurial groups in the process of economic, technological, and societal transformation?

The purpose of this article is to explain the emergence of a new practice (i.e., relocation) and the role of entrepreneurial groups in this emergence based on the revealing case of the early-modern needle industry in Germany. In the 18th century, Aachen became the leading production site for the needle industry in Germany and, for many decades, the city was also the leading location for needle production in the entire western world. Aachen's industrial rise is intrinsically tied to the emergence of an entrepreneurial group. Since the mid-17th century, the needlemaking sector was characterized by a labor division between two classes of guild members: One class of master craftsmen (domestic craftsmen) produced needle blanks in their workshops. Another class of master craftsmen (merchant producers) finished the product by making it into its sellable form and selling the goods. In the late 17th and early 18th century, there were presumably 19 merchant producers in Aachen. Guild rules prevented the merchant producers from relocating parts of the value chain to areas beyond Aachen with lower wages. After merchant producers had already made a first try at relocating parts of the value chain in the 1660s, an entrepreneurial group formed within the class of merchant producers in the 1690s with the goal of overcoming guild regulation. Consequentially, the class of merchant producers started to divide into, first, a smaller group of merchant producers (the entrepreneurial group) which aimed to establish a new practice (i.e., relocation) and, second, the remaining majority of presumably 14 merchant producers, who still operated their business in the manner which had been common practice for decades. In 1740, the entrepreneurial group finally succeeded in establishing the new practice after decades of power struggles.

But what makes these at least five merchant producers an "entrepreneurial group"? In terms of definition, I follow Harper, as he defines "entrepreneurial teams [as] a group of entrepreneurs with a common goal which can only be achieved by appropriate combinations of individual entrepreneurial actions" (2008, 617). In terms of notation, I use the connotation "entrepreneurial group" instead of Harper's "entrepreneurial team", since "team" implies a cohesive group and quite close collaboration (cf. Stamm, Discua Cruz, and Cailluet 2019, 7-35, in this issue). However, the surviving sources give no detailed information about the internal relations and the process of collaboration in the guild directorate. There are neither sources as transcripts or account books of the guild nor ego-documents like letters between the merchant producers (see below). Speaking of the investigated entrepreneurial group, I often use the term "leading merchant producers" to differentiate them from the remaining 14 merchants who controlled only a negligible part of the business (Koch 1920, 81).

Based on sources and historiographic literature, it is impossible to define a static group for the whole investigation period up to the 1750s. However, there is much evidence that there was a group composed of at least Cornelius Chorus and Gottfried Strauch (since 1693) together with Peter von Asten, Abraham von Sittart (since 1698), and Stephan Giessen (since 1699) (Thissen 1923, 9; Koch 1920, 80; Lingens 1921, 105). As Koch ascertains, also contemporary actors (local competitors and domestic craftsmen), viewed the group as being a collective actor (1920, 81). Each of the five merchant producers operated his own business. Simultaneously, they shared the common goal of overcoming regulation and, by doing so, of being allowed to relocate parts of the value chain to territories with lower wages. As the analysis will bring to light, the key to successfully overcoming the regulation was to follow a common strategy and to collaborate strategically in the guild directorate, which was both executive authority and court of first instance for economic law. The five merchant producers brought the guild directorate under their control and rotated among the senior positions on the board (Thissen 1923, 9). In doing so, they were in the position to suspend regulation and to achieve their common goal. It will become apparent that no single merchant producer could have overcome regulation on his own.

By enforcing relocation, the entrepreneurial group developed the well-known medieval and pre-industrial domestic system into an elaborated production network. Thus, they created substantial competitive advantages. The most influential entrepreneur, Cornelius Chorus, alone created a company of unprecedented size in the needlemaking sector, providing up to 1000 jobs by the 1730s. A company of comparable size, with approximately 700 workers, did not arise in this branch of industry in Continental Europe until 1815 (Aagard 1987, 226). The decline of guilds is a well know phenomenon in Germany's economic and social history (Reininghaus 2002) and the case of Aachen's needlemaking sector is of particular interest. As will become apparent, the decline of traditional guild structures went hand in hand with Aachen's industrial rise to the leading location for needle production in the entire western world.

Given the fact that the leading merchant producers faced strong resistance against their goal to enforce relocation, the questions arise: How were they able to succeed? How were they able to successfully overcome regulation? This leads on to the research quest that I address on the basis of this case: *How does an entrepreneurial group change industrial structures through the application of innovative business strategies?*

Searching for a methodological approach to analyze the interdependency between an established structure and collective agency, I discuss the concept of *institutional entrepreneurship* (IE) (chapter 2.3). To overcome the shortcomings of IE, I draw on the three-phase change model (Schumpeter 1939; Lewin 1947; Thomes and Quadflieg 2012; Schmidt et al. 2016) (chapter 2.2) and the

agency-structure concept (Giddens 1984; König 2001, 2009, 2013) (chapter 2.3) and try to integrate them into a *dynamic-reciprocal model of structural change* (DRSC) (chapter 2.4). Having outlined the methodological approach, I apply the DRSC to the given case (chapter 3). I then deduce and discuss the major findings and theoretical implications and give a brief outlook on research (chapter 4).

In terms of references, the article is based on relevant sources and comprehensive historiographic literature. Council minutes and petitions (1656-1800) deliver information about political and legal conflicts, as the city council was the autonomous lawmaker, supreme court, and executive authority for economic law (chapter 3.2). Earlier records have not been preserved because a city fire destroyed about 90 percent of Aachen in 1656 (Fromm 1894; Hildebrandt 1978; Kraus 2007). Moreover, all documents of the needlemaking guild (e.g., account books, minutes of guild assemblies) are unrecorded. Historiographic literature is characterized by an insufficient evaluation of the given research questions. One reason for this is that there has been almost no research on the history of needlemaking in Aachen over the last ten decades. Most parts of the relevant historiography about the history of Aachen's needle industry date from the early 20th century. Particularly, the history of the needlemaking guild in the 17th and 18th centuries has attracted only little attention, although the development of Aachen's needlemaking guild was quite unique (Aagard 1987). Apparently, that was the reason why many European countries were so keen to adopt the Aachen needlemaking approach (Koch 1920, 58 et seq.; Lingens 1921, 42 et seq.). Thus, I mainly draw on Joseph Koch (1920), Paul Lingens (1921), and Otto Anton Thissen (1923). Koch made an outstanding contribution to research on the history of Aachen's needlemaking sector, as he explored about 150 years of minutes, petitions, and other documents of Aachen's city council from the 1650s to the 1790s. Lingens (1921) gathered and compared data on the needlemaking sector in the Rhineland and in Westphalia. Thissen (1923) gathered a multitude of information about the biography and the family history of Cornelius Chorus. Actually, since World War II, there has been only one study on the protoindustrial history of this particular branch of industry, that of Herbert Aagard (1987). Aagard examined all needlemaking sites in Germany with a focus on the history of technology in the 18th century. Regarding the case of Aachen's needle business, the historiography focuses on individual entrepreneurs, such as Cornelius Chorus, and does not examine the particular role of cooperative actors (such as entrepreneurial groups) for the development of needlemaking (Hermandung 1908; Vogelgesang 1913; Koch 1920; Lingens 1921; Thissen 1923; Bruckner 1967: Aagard 1987).

2. Theoretical Framework

2.1 Institutional Entrepreneurship

Searching for a theoretical approach to explain the interdependency between structure and agency means breaking into the field of institutional entrepreneurship (IE). At the heart of IE is the institutional entrepreneur. As Garud et al. describe:

> To qualify as institutional entrepreneurs, individuals must break with existing rules and practices associated with the dominant institutional logic(s) and institutionalize the alternative rules, practices or logics they are championing. (2007, 962)

As a wide range of literature stresses, the concept of a rulebreaking actor leads to the paradox of embedded agency (DiMaggio and Powell 1991; Sewell 1992; Holm 1995; Seo and Creed 2002; Garud et al. 2007; Leca et al. 2008; Weik 2011). Leca et al. describe it as follows:

> If actors are embedded in an institutional field and subject to regulative, normative and cognitive processes that structure their cognitions, define their interests and produce their identities how are they able to envision new practices and then subsequently get others to adopt them? (2008, 961)

To overcome the paradox, IE understands institutions as being both enablers and constrainers of action (ibid., 5). There are two types of enabling and constraining conditions: field-level conditions and individual-level conditions. Field-level conditions refer to enabling and constraining predispositions (such as organizational field characteristics) or acute events (such as a crisis affecting interorganizational collaboration) (ibid., 7). First, individual-level enabling conditions refer to an actor's "access to resources needed to engage in institutional entrepreneurship" (ibid., 9). Second, individual-level conditions refer to an actor's specific characteristics, such as the ability "to relate to the situations of other actors and, in doing so, to provide them with reasons to cooperate" (ibid., 10). Another attempt introduces the concept of "autonomous reflexives" (Mutch 2007).

In terms of competencies that are needed for a person to qualify as an institutional entrepreneur, Weik says: "With regard to their concrete actions, we find that [institutional] entrepreneurs mobilize resources and mobilize other actors [. . .]" (2011, 468). Garud et al. emphasize: "[Institutional entrepreneurs] mobilize wide ranging coalitions of diverse groups and […] generate the collective action necessary to secure support for and acceptance of institutional change" (2007, 962). To build up coalitions they "must be skilled actors who can draw on existing cultural and linguistic materials to narrate and theorize change in ways that give other social groups reasons to cooperate" (ibid., 962). Leca et al. put it in a nutshell and stress two questions as being central to the

field of IE: "(1) Under what conditions is an actor likely to become an institutional entrepreneur? (2) How does the process of institutional entrepreneurship unfold?" (2008, 6).

That makes the perspective of IE clear: Its focus is on how some actors, rather than others, become institutional entrepreneurs. Actually, the literature addresses a wide range of requirements for becoming an institutional entrepreneur, such as social skills (ibid., 12) and an actor's social positon in the field (Waldron et al. 2014). Leca et al. summarize all these requirements as tangible or intangible resources (2008, 15).

The reductionist perspective on what makes an actor an institutional entrepreneur may misdirect "attention to heroes and success in a linear timeline [. . .] and away from collective efforts, failures and repeated attempts, loops, feedbacks and interdependencies that the history of institutions is so rich in." (Weik 2011, 472). Apparently, Gartner's charge is still current as he has accused research on entrepreneurship of having:

> a tendency to underestimate the influence of external factors and overestimate the influence of internal or personal factors when making judgements about the behavior of other individuals. (1995, 70)

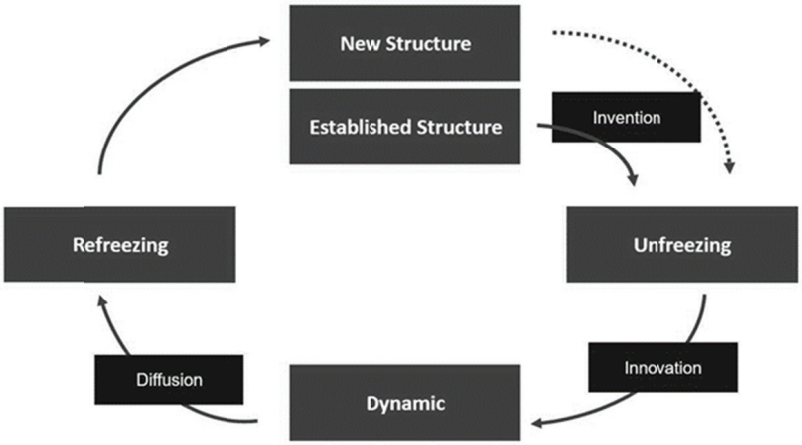
It becomes apparent that IE cannot be easily applied to the given case, as it is the purpose of this article to examine the emergence of a new practice (i.e. relocation) and the role of entrepreneurial groups in this emergence. IE is lacking an equal balance between structure and action. Thus, it is necessary to bridge the reductionist perspective on what makes an actor an institutional entrepreneur. The focus of this article is neither on their individual skills from an intrapersonal perspective nor on their internal group dynamics. Instead, the focus is on their strategy for successfully exceeding the scope of the structural conditions. An approach is needed that allows the change process to be described as a dynamic-reciprocal process of interdependencies between agency and structure, including loops, feedback, and interdependencies.

2.2 Three-Phase Change Model

To discuss how an entrepreneurial group does change industrial structures through the application of innovative business strategies, it is necessary to determine what change means. I define change in economic and societal structures based on the three-phase change model (TCM) (Thomes and Quadflieg 2013, 39; Schmidt et al. 2016, 45). The TCM defines change as a dynamic process, following Lewin's three-step change model (Lewin 1947). Recent articles have stressed the continuing significance of Lewin's thoughts (Hussain et al. 2016; Odor 2018). As Cummings et al. show in their review, Lewin's work has influenced "change management, change theory and practice to this day [and its] *foundational significance* [has] remained unquestioned" (2016, 33).

Thomes combines the three-step change model and central categories of diffusion theory (Schumpeter 1939, Rogers 2003) to generate a dynamic model, thus allowing their repercussions for new structures to be described. The TCM features a broad concept of innovation in the sense of a paradigm shift which is relatable to technology innovation, as well as to organizational innovation, by analogy to Roger's definition of innovation: "An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (Rogers 2003, 12). Negating the existence of structural static as such, the model offers an evolutionary explanation for a continuing change process. This makes the model the ideal starting point for my study.

Figure 1: Three-Phase Change Model (TCM)



Source: Schumpeter (1939); Lewin (1947); Thomes and Quadflieg (2012); Schmidt, Seibel, and Thomes (2016).

Starting from the status quo (i.e., the established structure), a new idea challenges the established structure (i.e., an invention). In this phase, the established social system impedes the diffusion of a new idea as a "barrier to change" (Rogers 2003, 24, 26). With the first application of new ideas, the unfreezing begins. This early stage is characterized by a high degree of uncertainty about whether the new idea will be able to displace the established paradigm (Rogers 2003, Hekkert et al. 2007, 422). In the dynamic phase, the new idea starts to displace the earlier established paradigm and gradually becomes common practice (Odor 2018, 60). As Lewin's approach is not a closed concept, authors use different terms to describe the second phase (e.g., change, transition, movement, dynamic) (Thomes and Quadflieg 2012; Cummings et al. 2016; Odor 2018). During the unfreezing or refreezing phases, the new practice stabilizes and becomes the new paradigm (Odor 2018).

In terms of theoretical shortcomings, the TCM only describes an exemplary change process and cannot explain either interruptions to change or new attempts. Moreover, the TCM is limited to a structural perspective. What is the role of agency in the process of change? Rogers' agency-related periodization of *innovators*, *early adopters*, *early majority*, *late majority,* and *laggards* (Rogers 2003, 285 et seq.) helps to describe the function of change agents in different phases of diffusion. However, he only briefly sketches the role of the established structure (Rogers 2003, 26). To explain how the established structure enables and prevents paradigm shifts, I draw on the agency-structure concept (chapter 2.3).

2.3 Agency-Structure Concept (ASC)

Having defined change as an evolutionary and continuing process, I now explain why I draw on ASC instead of simply applying IE in order to analyze the interdependency of agency and structure. Therefore, I discuss both approaches in comparison. The starting point for Wolfgang König, when outlining his ASC, is Anthony Giddens' seminal work, The Constitution of Society (König 2001, 2009, 2013; Giddens 1984). Giddens initialized a fundamental debate on how societies are constituted and how they arise and change through individual acting. His structuration theory builds upon the duality of structure: "The duality of structure is always the main grounding of continuities in social reproduction across time-space" (Giddens 1984, 26). König criticized the structuration theory by rejecting Giddens' institutions concept. Negating the existence of structure as such, Giddens defined institutions as intermediaries (e.g., manifested in the form of legal systems, politics, and economies) between the structure and the actor (Giddens 1984, 28 et seq.). König concluded that Giddens' concept was unsuitable for empirical analysis and for case studies (König 2009, 97; Schneider 1989, 31 et seq.). This leads to the point where König wanted to set his concept apart from Giddens' theory:

> The actor-groups act within the structures which can be interpreted as enabling and constraining forces to what human beings intend to do and what they are doing in reality. (König 2001, 104)

At first glance, this makes his approach suitable for the purpose of my study, as I aim to examine the strategic action of a particular entrepreneurial group.

König understands history as a possibility space of potential evolution, where agency (the particular action of individuals, groups or organizational entities) affects the progress of history, following the rationale of historical contingency. He chooses a three-level model for analyzing actor behavior, including the micro-, meso-, and macro-levels. Since this approach is not limited to a particular scale level (Christian 2005, Revel 2010), one can apply this to cases with meso-level actors (Table 1). This discrimination may be important, as I analyze the particular role of entrepreneurial groups (meso-level

actors) as distinct from individual entrepreneurs (micro-level actors) in the process of structural change.

Table 1: Actor Levels

Levels	Actors
Macro	Elements of Society (social classes, occupational categories, consumers, etc.)
Meso	Organizational entities (corporations, governments, entrepreneurial groups, etc.)
Micro	Individuals (inventors, entrepreneurs, laborers, politicians, etc.)

Source: Based on König (2001, 2009, 2013).

Based on the assumption of historical contingency, König drafts choices of structural characteristics, leading to possible spaces of activity. Thus, the ASC offers useful tools for describing the constraining and enabling effects of an established structure on actors' behavior and for analyzing the repercussion effect of entrepreneurial behavior on the newly emerging structure.

On the one hand, König's ASC and IE have many things in common. Based on Giddens' duality of structure, König also addresses the paradox of embedded agency, albeit implicitly. Thus, ASC and IE, first, share the same starting point: the assumption of presupposed context-induced enabling and constraining factors affecting agency. Second, similarly to the concept of a rule-breaking institutional entrepreneur, the ASC assumes that agents can decide either to act within the scope of the possibility space or to exceed it.

> Very often they [agents] act in accordance to the structures which in this way are perpetuated. If the actors consider the structures as being too restrictive, they could try – and sometimes will be successful – to initiate change in the structures. (König 2001, 104)

On the other hand, König's ASC varies significantly from the IE. First, there is a variation in the terminology. In the field of IE, the term "institutions" is used in accordance with the definition of such as "formal and informal rules of the game in society" (Schotter 1981, 9; Schotter 1986, 117; Erlei et al. 2007, 22; Garud et al. 2007, 958). However, König deviates from this definition. He speaks of institutions as organizational entities (König 2013, 510). Following this rationale, the ASC concept defines institutions as being meso-level actors, such as "business firms" and "associations" (König 2001, 104). König rather speaks of "structural conditions" if he refers to the meaning of "institutions" in accordance with the definition cited above (König 2001, 2009, 2013). Second, ASC and IE have different perspectives on the link between agency and struc-

ture, as the focus of IE is on how some actors, rather than others, become institutional entrepreneurs. König's enabling and constraining conditions build up a possibility space affecting all actors in the field, no matter whether they are able to leverage their tangible and intangible resources in order to break the rules or whether they act within the scope of the possibility space. This is what makes the ASC the more suitable approach for my own analysis.

As my focus is neither on their individual skills from an intrapersonal perspective nor on their internal group dynamics, I do not examine the process of formation of the investigated entrepreneurial group. Instead, my focus is on their strategy for successfully exceeding the scope of the structural conditions. I examine their (external) interaction with the established structure and other actors (such as other local merchants and domestic craftsmen). The latter are also affected by structural conditions without being institutional entrepreneurs in the sense of groundbreaking change agents. The ASC, whose focus is not limited to the successful actors, may be the suitable approach to bridge the shortcomings of IE.

In terms of limitations, the ASC, as a static model, fails to consider that the constitutive effect of activity is an evolutionary process. Following the rationale of Rogers' diffusion theory (2003), I assume that the enabling and constraining forces diminish – step by step. Thus, the ASC alone does not allow an analysis of the role of actors in a dynamic step-by-step change process. Possibly, an integration of ASC and TCM may solve the shortcomings of both the ASC and the TCM.

2.4 Dynamic Reciprocal Model of Structural Change

Before introducing an integrated approach of TCM and ASC, I return to the limitations of both concepts in order to discuss the potential value of a DRSC. The TCM only describes an exemplary change process and cannot explain either interruptions or new attempts. I argue that these phenomena are results of the interplay of the established structure and agency, which is the domain of the ASC. If innovative actors try to enforce a new paradigm but the constraining forces of the established structure are too strong, this can lead to failures and new attempts (Weik 2011, 472). The TCM, vice versa, may solve the shortcomings of the ASC. I assume that the constraining forces of the established structure diminish in the course of the advancing change process, and König's approach lacks an explanation for this phenomenon. However, that is where the TCM allows us to understand the dynamic phase as an overlap of established and newly emerging structures.

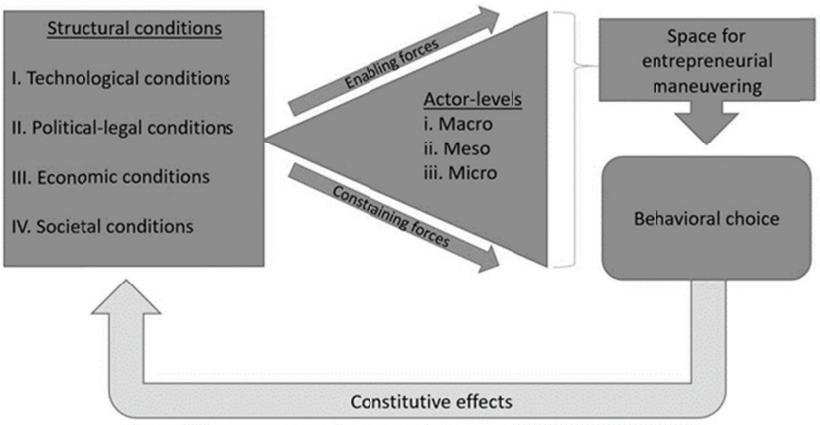
The starting point of a dynamic reciprocal process of structural change is the established structure. I use factors from the social, technological, economic, political, legal, and environmental (STEPLE) analysis (Aguilar 1967, 11; Andrews 1980, 55, 69; Lynch 2003, 93 et seq.) to shape the possibility space.

STEPLE is highly adaptable for historical research (Peters 2017) and one of many approaches intending to contextualize entrepreneurship, which has received considerable attention in various socio-scientific sub-disciplines. Most of them are quite similar and differ rather in terminology than in meaning. (Welter 2011; Autio et al. 2014; Boutillier et al. 2016).

For my own analysis, I apply a condensed version of the STEPLE categorization in order to systemize my analysis of structural conditions. More specifically, I combine *political* and *legal conditions*, because clearly distinguishing between statutory law and policy appears almost impossible for the period of investigation. The political and legal systems of Aachen were characterized by a coexistence of customary and codified law (Hermandung 1908, 18). Moreover, I subsume geographic circumstances under *economic conditions (in terms of hard location factors)* and do not consider *environmental factors (in terms of environmental sustainability)*, since this post-modern concept is not of particular interest for the period of investigation.

The established structure can be described by enabling and constraining factors opening up a possibility space of entrepreneurial behavior. Following the rationale of König, actors can decide either to act within the scope of the possibility space or to exceed it. In terms of the three actor levels, I adopt the taxonomy of the ASC. Figure 2 illustrates the adopted ASC, including the effects of structural conditions on the possibility space and the constitutive repercussion of actors' behavior.

Figure 2: Agency-Structure Concept as a Dynamic Approach

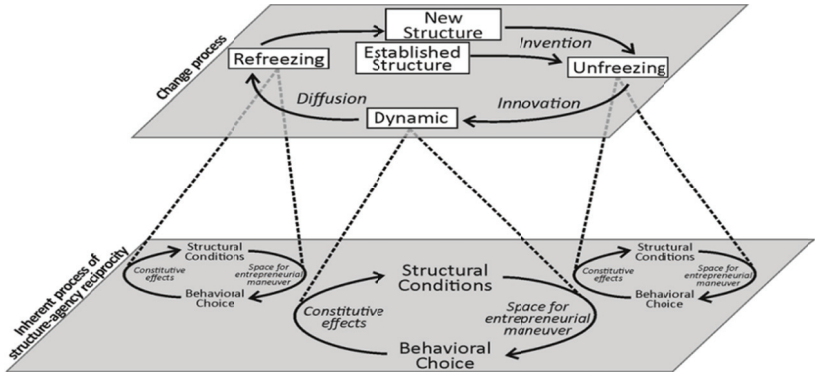


Source: Created by the author referring to König (2001, 2009, 2013).

I hypothesize that this interplay of agency and structure reiterates over time and that this iterating cycle proceeds on a sub-level of the TCM (see Figure 3). The inherent cycle can be described as a sequence of structuration (in terms of

Giddens), leading to an incremental process of structural change in which the established structure becomes replaced by the newly emerging structure. I hypothesize that the enabling and constraining effects resulting from the established structure diminish, phase by phase (in terms of the TCM). Therefore, I propose that the established and new structures overlap.

Figure 3: Dynamic Reciprocal Model of Structural Change



Source: Author's own figure.

3. Case Analysis

To apply the DRSC, I follow this taxonomy: Having defined a particular entrepreneurial group as the object of investigation (chapter 1), I first define the investigation period to clarify for which period the structural conditions are valid (chapter 3.1). Second, I analyze the structural conditions for the established structure in the initial situation (chapter 3.2). Third, based on this structural analysis, I describe the resulting possibility space for an actor's behavior (chapter 3.3). Of course, the possibility space depends on which actor is to be analyzed. The space for entrepreneurial maneuvering may differ depending on the type of actor that is the focus of the analysis. Logically, the same structural analysis leads to different possibility spaces for different actors. For example, laissez-faire dismissal protection, on the one hand, may enable entrepreneurs to follow a policy of hire and fire. On the other hand, the same deregulated labor market may constrain the space for maneuvering for employees because they are in a weak market position. Fourth, I analyze the actor's behavior (chapter 3.4). This step allows for an examination of the behavior of actors within the possibility space and the resulting repercussion effects on the establishing structure. To paraphrase, in this step I can reveal an actor's role in the process of change. Has the actor exhausted his space for

maneuvering? What is this actor's specific role within the change process? To what extent is the actor's behavior responsible for structural change?

3.1 Period of Investigation

When I talk of the idea of "relocation" of needle blank production as the examined new practice, the first evidence of relocation dates from 1661. At this time, the merchants' attempt to relocate was effectively suppressed by the guild (chapter 3.2). The established structure still controlled the merchants' efforts. In the terminology of the given model, the invention of the relocation of needle blank production can be proven for the year 1661. Obviously, an earlier invention cannot be ruled out, but strong evidence shows that this was the first substantial case of relocation: Since 1656, all council minutes have been preserved. In the following decades, there are only scattered indications of efforts to undermine guild law (Koch 1920, 75). The next substantial relocation attempt can be proven for 1693, when needle merchants received permission from the guild to relocate production stages to locations outside Aachen (Koch 1920, 75). Henceforth, the dispute about relocation became the dominant issue within the needlemaker guild. Up to this point, the date of the initiation of the unfreezing phase can be determined as 1693. Consequentially, I focus on the time period from 1693 onwards. The end of my investigation period is the mid-18th century. By 1740, the entrepreneurial group had successfully overcome regulation and stabilized the relocation practice as the new paradigm (chapter 3.4).

3.2 Established Structure in the 17th Century and the Early 18th Century

In this chapter, I analyze the structure of the needlemaking sector for the second half of the 17th century. This structure defines the initial situation and the established structure (see Figure 3). Therefore, I describe the particular structural conditions to extrapolate the specific possibility space for merchant producers.

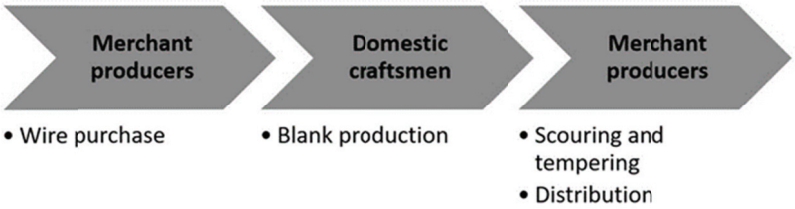
Technological conditions: The manufacturing process was regulated by guild rules from 1615 onwards. This legal framework set a strict mandate for residents of Aachen and its peripheral territory who wanted to produce needles. Master craftsmen were obligated to use only fine and pure steel to produce needles and were forbidden to use iron (Guild Rules 1615). Thus, guild rules provide important evidence of the specific manufacturing technique that Aachen's needlemaking sector used. The only way to make steel wire into pointed needles was to smash through it by using a steel chisel with a flattened tip (von Pöllnitz 1737, 862; Koch 1920, 24, 44). By committing all needlemakers to using steel wire only (and no iron wire), Aachen had a substantial technological advantage in the 17th century. With a carbon content

greater than 0.45 percent, steel wire is much harder than its iron counterpart (Aagard 1987, 94). Thus, the final product had a perfect hardness and elasticity for its purpose (Koch 1920, 24 et seq.). This is highlighted by the transfer of technology in the late 18th century, when competitors from other regions–for example, Altena (Germany)–adopted (ibid., 58 et seq., 119). Until then, Aachen was able to protect its technology leadership.

The process of producing needles was very labor-intensive. Herbert Aagard describes the different methods of needle production in the 17th century in his illuminating 1987 dissertation. His work shows that needle production was literally a handicraft (Aagard 1987, 97-195) because most production stages could not be mechanized, much less atomized, until the 20th century (Vogelgesang 1913, 110). All sources suggest that needle production required highly specialized labor. The worker needed such specific dexterous skills for handling the tiny objects that often children were employed, too.

Although needle production was less capital-intensive, capital played a role in the last production stages. Based on the model of domestic systems, a division of labor arose during the 1630s. One group of master craftsmen (domestic craftsmen) produced needle blanks in their workshops. Another group of master craftsmen (merchant producers) finished the product by making it into its sellable form and selling the goods.

Figure 4: Labor Division in Aachen's Needle Industry Since the 1630s



Source: Author's own figure.

This division of labor was based on the application of watermills; more precisely, water power was the critical trigger for the division of labor in the needlemaking sector. The merchant producers used the mills to grind and polish the needles (Koch 1920, 48). Water power was a well-known technology in Aachen, as well as elsewhere. Water mills were first used in Aachen (for metalworking) in the first half of the 14th century. Even then, wire-drawers used watermills to get finer wire (Koch 1920, 19). With water power, needle producers used a technology to make polishing the needles much more efficient. In addition to this *efficiency effect*, the water-operated scouring tables produced sharper needles, and this led to an *effectivity effect* (ibid., 19). The basic principle of scouring tables is easy to describe: The needle blanks are

packed in moist canvas strips in several layers. Then, a mixture of scouring powder is applied before the canvas is tied. Several scouring bolts are placed between two wooden panels on a scouring table (Aagard 1987, 156). Before water-powered scouring benches were adopted, first traceable in Aachen in 1633, the scouring tables had been hand-operated (Aagard 1987, 160 et seq.). Eventually, the exploitation of water power led to significant efficiency gains. Before water-operated scouring tables were used, the maximum filling quantity of each scouring bolt was 15,000 needles. Hand-operated scouring tables could process only two bolts at once and the procedure took about two days (ibid.).

Due to the water-operated system, a producer could process scouring bolts of about 90,000 needles apiece (ibid., 159, 172). Previous sources mention different figures. Koch quantifies the number at 30,000 to 35,000 needles per scouring bolt and 12 to 20 bolts per scouring table. However, water power undoubtedly enabled more efficient and more effective production. Thus, the capacity can be estimated as 360,000 to 700,000 needles per scouring table. Even the water-operated scouring process took about two days (Koch 1920, 45-48). Following the data, we can determine an approximate significant capacity increase through the adoption of water-operated scouring tables of 1,000 to more than 2,300 percent.

The efficiency effect was extraordinary. Obviously, water-operated scouring mills offered significant economies for anybody who might own such facilities. At the same time, scouring mills with the mentioned capacity were not feasible for an individual domestic craftsman because no one artisan could ever supply 300,000 to 700,000 needle blanks in two days. Therefore, several master craftsmen concentrated on this production stage and focused the output of many needlemakers on scouring the needle blanks in their scouring mills (ibid., 48). This tremendous efficiency effect resulted in a comprehensive application of this mass-production technique during the mid-17th century. Further, this technique provided the division of labor between the domestic craftsmen and the merchant producers (Bruckner 1967, 142).

Political-legal conditions: Since 1166, Aachen had held a unique political position. At that time, Emperor Frederick I (*Barbarossa*) conferred a special status on Aachen. Since then, Aachen had been a Free Imperial City and thus, had extensive rights of autonomy until the French occupied the city in 1794. Moreover, the special status led to an exemption from duty for trade within the Holy Roman Empire. King Charles the Wise (1338-1380) granted an exemption from trade duty to all merchants who exported from Aachen to French territory. This special relationship with France lasted until the 16th century. These advantages led to an early continental interweaving between Aachen and the most important trade centers (ibid., 51 et seq.). Moreover, Aachen was surrounded by several foreign territories with different economic and political regimes due to the typical German scattered regionalism during the early modern age. I argue that, for that reason, it is justified for this article

to talk of "foreign" territories and to distinguish between a domestic and a non-domestic workforce.

Based on these conditions, the needlemaker guild in Aachen officially arose in the early 17th century. However, as Alex Hermandung's findings on the guild history of Aachen imply, the needlemaker guild had been in existence earlier, as the city council had enacted the guild rules in 1615 (Hermandung 1908, 18). For this article, I concentrate on the codified legal framework that the city council enacted in 1615. Henceforth, guild rules created the legal framework for the needlemaking sector. Anybody who wanted to produce needles in the city of Aachen or its surrounding territory had to comply with these regulations. Thus, every man who wanted to make needles in his own workshop had to join the guild.

In terms of the legal system, the city council was the autonomous lawmaker, supreme court, and executive authority for economic law. Guild rules were mandatory standards, valid within Aachen's territory, although neither the guild leaders nor the city council had any executive agency to enforce the law. Moreover, the enforcement of the guild rules was highly dependent on the guild directorate because that was the inspectorate body for the needle sector as well as the executive authority and the court of first instance for economic law (ibid., 59, 63 et seq.).

Beginning in 1615, guild rules stipulated the requirements for becoming a master craftsman. First, the guild established a training system in which an apprenticeship took three years to complete and every apprentice had to register for the guild. Moreover, the apprenticing master craftsman had to pay a registration fee for the apprentice. After three years, the young needlemaker could be examined through his manufacture of a "masterpiece." In addition to the examination, he had to pay a fee to the guild for his final registration. Then, the needlemaker was a fully entitled master craftsman and a member of the guild. Every master craftsman had active and passive electoral rights for the election of the guild directorate which took place every year on April 30 (Guild Rules 1615; Koch 1920, 33 et seq.).

Guild rules also limited the maximum size of a workshop. Each master craftsman was allowed to employ up to four apprentices and only one apprenticed servant. Koch points out that guild law followed the principle of equality between all master craftsmen. Concerning the organizational structure of production, Koch's findings reveal that master craftsmen accomplished all the working steps as an integrated production process in their workshops (Guild Rules 1615; Koch 1920, 33 et seq.). To sum up, the central legal framework created a traditional system of shop fabrication. Significant growth of the workshops or labor division was not intended, neither inside nor outside Aachen (Hermandung 1908, 67 et seq.). In the first decades, the guild directorate was anxious to sustain the regime by concretizing the legal framework. As early as 1631, the guild rules were supplemented to segregate

domestic from non-domestic products through the codification of former customary law. Foreign needlemakers from areas outside the territory of Aachen should not be allowed to sell needles by using the designation "Aachen" for their trademarks (Guild Rules, first amendment 1631). Likewise, the needlemaker guild intervened emphatically in 1661, when merchants from Aachen hired non-domestic workers to manufacture needle blanks. The domestic craftsmen objected successfully to this new procedure (Council Minutes June 5, 1661). Koch attests that this verdict made an impact upon the business routine for needlemaking in the next few decades (Koch 1920, 39).

Economic conditions and geographic circumstances: The empirical material yields relevant factors: water resources, infrastructure, factor costs, and oversupply of experienced workers.

First, water resources are an important factor. Rich water resources had been the fundament of the settlement of brass producers in Aachen in the 15th century and Aachen's rise to the leading location for brass production in Europe. Since the 17th century, the needlemaking branch also used this technology (Bruckner 1967, 142). After the comprehensive application of scouring mills caused labor division, there is a second relevant factor to add. No master craftsman could produce large amounts of needles in his workshop with a limited number of workers and (simultaneously) place his products in continental markets. Long-distance trade meant traveling hundreds of miles by coach in the 17th century. This factor also caused the division of labor in the needlemaking sector. A domestic system became established, and the merchant producers arose as a second category of master craftsmen. Although labor division was not intended by the guild, there is no indication of any resistance during the 1630s. Instead, domestic craftsmen seemed to take up the challenge of the fight for equality within the specialized system (regarding the various guild conflicts, especially towards the end of the 17th century, see chapter 3.4). Nevertheless, the merchant producers gained the upper hand after that. They were in the stronger market position because they supplied the wire, tempered the needles, and owned the scouring mills, thus controlling the most important production stages which were critical for the quality of the manufacture (Koch 1920, 39).

The second factor is the infrastructural conditions. Due to Aachen's political and religious prominence for many centuries, the city became well connected to interregional and continental trade routes early on. Moreover, Aachen was accessible by road from many regions. This location supported the development of all businesses in Aachen through comfortable access to factor and sales markets (Ibid., 14 et seq.).

Third, the factor costs are important for analyzing the economic conditions, especially in comparison to other territories beyond Aachen. On the one hand, the urban population had relatively high living costs and often no other income except the inhabitants' regular occupation. On the other hand, the rural

population could produce needles or other products as a secondary occupation in addition to farming. Additional nonwage labor costs within Aachen resulted from the guild fees and from special fees for selected production stages (Koch 1920, 66, 77).

Fourth, the oversupply of experienced wire workers since the late 16th century was an important economic factor. After Aachen had become the leading location for brass production in Europe, an exodus from Aachen to Stolberg (Rhineland) began during the mid-16th century (Römling 2007, 145 et seq.; Bruckner 1967, 147). Therefore, Aachen had lost its position as the European market leader by the second half of the 18th century. Previous researchers assumed that the Counter-Reformation caused this rapid economic downfall of Aachen's brass sector. Some authors claim that the predominantly Protestant brass masters were forced to migrate from Aachen to Stolberg because of their religious denomination. However, recent research proves that the exodus of Aachen's brass sector was due to economic reasons (Thomes and Quadflieg 2012; Peters 2017). As a result of this development, many laborers from the brass sector became underemployed, and the needle sector benefitted from the large number of workers who were experienced in metal working (Vogelgesang 1913, 27).

As the last category, I analyze the particular societal conditions. Aachen was characterized economically by guild structures and sectorially by textile and brass manufacture. Each guild funded a unified system of apprenticeship. Thus, the guilds wanted to ensure labor quality. Skills and knowledge had been handed down from generation to generation through this long tradition of imparting expertise. First, this affected the needlemaking sector through the enduring oversupply of experienced wire workers. Second, the system of apprenticeship created highly qualified craftsmen.

3.3 Derived Possibility Space

Based on the previous structure analysis for the late 17th century, I now turn to describe the possibility space for merchant producers in general. Table 2 classifies the structural conditions into enabling and constraining factors.

In terms of technological conditions, through the established structure merchant producers benefitted from substantial technology advantages compared to the producers' continental competitors. Thus, these merchant producers produced higher-quality needles and benefitted from their dominant market position as owners and leaseholders of the scouring mills.

In terms of political-legal conditions, the merchant producers' entrepreneurial behavior was constrained by strict regulation. Thus, significant growth of workshops and cross-border expansion to relocate needle blank production were illegal. However, the merchant producers were protected against competitors from other areas outside the territory of Aachen, who were not allowed to

use trademarks bearing the designation "Aachen." Moreover, the political-legal system had no agency to execute the law in order to enforce regulation against domestic entrepreneurs. This lack of agency might have been a potential gateway to undermining the regulation.

Table 2: Enabling and Constraining Factors for Actor Behavior

Structural conditions	Enabling factors	Restricting factors
Technological conditions	– application of predominant technology (steel wire) – application of water- – powered scouring tables – with resulting efficiency gain for merchant producers	
Political-legal conditions	– no/weak executive agency – participation through active and passive electoral rights	– strict regulation (growth of workshops, job relocation, market access)
Economic conditions	– available water resources – dominant market position – immediate access to continental trade routes – oversupply of experienced laborers	– high labor costs (high living costs compared to rural areas, nonwage costs)
Societal conditions	– traditionally prevalent and institutionally secured knowledge and skills	

In terms of economic conditions, the merchant producers' initial position was good. Unhindered access to resources and continental trade routes, Aachen's status as an Imperial City, and an oversupply of experienced laborers were important. The only disadvantage was the relatively high labor costs. Last, in terms of societal conditions, the merchant producers benefitted from an established training system that produced a highly qualified and skilled workforce.

3.4 Actor Analysis

Based on the taxonomy of the DRSC, this chapter analyzes the entrepreneurial behavior of merchant producers as a collective meso-level actor. To call the guiding question to mind: How does an entrepreneurial group change industrial structures through the application of innovative business strategies?

The first recorded evidence for joint entrepreneurial action dates from 1693. A group of merchant producers secured a guild decision to allow the placing of

orders for needle blanks with non-domestic workers (the relevant production stages involve the complete manufacturing of needle blanks). This decision was presumably provoked by the mentioned entrepreneurial group in order to take advantage of wage differentials between the guild-organized domestic craftsmen in Aachen and the rural population of the surrounding territories (Council Minutes September 26, 1696, October 15, 1696). Wage differentials resulted first from the lower cost of living in rural regions and second from guild fees that the craftsmen had to pay in Aachen (chapter 3.2). In this respect, the entrepreneurial group's track can be interpreted as an attempt to subvert the legislation of a highly regulated labor market in Aachen.

As Koch noted, the city council revoked their previous decision and interdicted the placing of orders with non-domestic workers due to the objections of the domestic craftsmen (1920, 76). Nevertheless, the entrepreneurial group did not observe the prohibition, thus, many domestic craftsmen became underemployed (Council Minutes January 3, 1696). Consequently, they opposed and assaulted the merchants and seized the wire and needle blanks produced abroad. In response to this riot, the city council commissioned a delegation to investigate and to order the situation in the needlemaking sector. The results could not have satisfied the domestic craftsmen at all because the city council de facto allowed the merchants to do as they liked (Council Minutes December 22, 1695), thus, further riots occurred. In response to this continuing conflict, the council modified its regulations yet again. Primarily, it prohibited the placing of orders with non-domestic workers. Moreover, the council forbade payment with goods instead of money (Council Minutes January 3, 1696). Later, the council allowed merchants to relocate if the domestic craftsmen could not provide a sufficient supply, but only for the thickest needle numbers. The diameter of the needles was declared in numbers: one, the thickest, to ten and later up to twenty, the slimmest. Council Minutes from 1699 and 1700 indicate that relocation became common practice because the entrepreneurial group ignored the council's decision (Council Minutes October 16, 1699; Council Petition April 22, 1700). Developments up until 1696 show that the entrepreneurial group gathered around Cornelius Chorus can be identified as an innovator concerning the relocation approach. As the first result, an appreciable change occurred in the given structure. The merchant producers exploited the possibility space through rigid non-compliance with the ban on a non-domestic workforce. The legal system was not able to prevent the merchants from ignoring legislation. As I brought to light in chapter 3.2, the established structure had no executive agency to enforce guild law. The merchant producers ably exploited the Achilles' heel of the guild-regulated structure. Ultimately, the city council amended the guild law and allowed relocation of parts of the production program.

The unrelenting strategy of the entrepreneurial group was economically crowned with success. Obviously, a fundamental gap had arisen by 1708 be-

tween the group and the majority of 14 smaller merchant producers. Cornelius Chorus alone employed about 50 laborers in his facility in 1700. In addition, 50 to 60 domestic craftsmen worked for him, either decentralized in their workshops or as homeworkers in Aachen, as a petition by domestic craftsmen claimed. There is no reliable information about the number of workers for each of the leading merchants. Certainly, the data for Stephan Giessen offer an indication of the approximate size of the other merchant producers' enterprises. Giessen employed 33 servants and apprentices in his facility and controlled 15 domestic craftsmen in 1699. Data on the enterprise size of the other leading merchants are missing. By comparison, the 14 smaller merchants controlled only eleven domestic craftsmen in total (Koch 1920, 81). The domestic craftsmen controlled by the entrepreneurial group, however, were still fully registered master craftsman and members of the guild. Nonetheless, they were economically dependent on the leading merchant producers. The entrepreneurial group granted the craftsmen advances on their work and paid them with goods rather than with money (Koch 1920, 82 et seq.; Bruckner 1967, 186). Thus, the domestic craftsmen were wageworkers rather than independent craftsmen in terms of the medieval and protoindustrial domestic system (Kocka 2016, 25 et seq., 35 et seq., 44 et seq.).

The entrepreneurial group exploited their financial resources to overcome regulation in the long run. Since the turn of the century, the entrepreneurial group collaborated to control the guild directorate and rotated among the leading positions on the board. Chorus and his allies put their dependent employees under pressure to control their voting activities by offering them credits on fees or advance pay (Koch 1920, 82; Council Petition, October 9, 1709). Thus, they controlled the executive authority and the court of first instance for economic law (chapter 3.2) and were in the position to suspend any regulation. Domestic craftsmen claimed that the ban on a non-domestic workforce had not been enforced since the turn of the century. Moreover, domestic craftsman claimed that Cornelius Chorus bribed guild members to vote for him to become a member of the guild directorate (Koch 1920, 82 et seq.; Council Petition March 15, 1709).

In the 1690s, the group successfully adopted the innovative approach of relocation. In this phase, the merchant producers were still affected by regulation. However, they successfully exceeded the possibility space. As a result, the established structure of guild regulation started to unfreeze. Over time, the change process advanced under the impact of this group. In the first decade of the 18th century, the relocation of needle blanks manufacturing became an increasingly common practice in the needlemaking sector. After approximately 1700, the innovative idea of relocation diffused and started to replace the established division of labor between merchants and domestic craftsmen, as had been common practice since the 1630s. During this highly dynamic phase, the entrepreneurial group was a key player in the dynamic change process. Togeth-

er, the leading merchants leveraged the legal system; but how could they succeed in exploiting the possibility space?

It becomes apparent that there were two critical success factors: First, neither the guild nor the city council had the means to preserve the established guild structure. Thus, the weakness of the legal system served the entrepreneurial group as a gateway to initiate a new practice. In doing so, the group initiated a momentum by enforcing the relocation practice because the leading merchant producers' strategy was economically crowned with success. They achieved a dominant economic position and their businesses increased. In contrast, their 14 opponents apparently decided to act within the scope of the possibility space and complied with established guild rules. Consequently, only the entrepreneurial group could mobilize considerable financial resources. The second critical success factor was that the entrepreneurial group decided to collaborate in the guild directorate to suspend regulation in the long run. No single merchant producer could have overcome regulation by himself. Only as a cooperative (meso-level) actor could the merchant producers successfully control the whole guild directorate by controlling the majority of domestic craftsmen through credits, advances, and vote buying.

With these findings in mind, the reaction of the city council is important. The city council overruled the decision to regulate the needlemaking sector top-down. As though the city council were aware of its weak position, it started a new approach to address the conflict between the entrepreneurial group and the other guild members. In 1709, the council tried to reach an agreement between these groups to settle several differences, such as the maximum number of workers each merchant producer was allowed to employ in his facility. However, the conflict over the relocation of needle blank production remained unresolved (Koch 1920, 81). As mentioned in chapter 3.2, as of 1615, the guild rules limited the number of workers that each master craftsman was allowed to employ in his facility to a cap of four apprentices and only one apprenticed servant. The leading merchant producers ignored this limit for a decade. For example, Chorus and Giessen each employed more than 30 persons in their facilities. Chorus alone built up an enterprise with approximately 100 to 120 workers in Aachen in the early 18th century. Following a report from 1710, he presumably employed two to three times as many non-domestic workers as in Aachen. Altogether, his business counted 200 to 360 workers (Bruckner 1967, 186 et seq.; Koch 1920, 83).

The first draft of the suggested agreement from 1709 intended to increase the number of workers to 35 heads per guild member (Council Minutes March 7, 1709). This number is interesting because both Chorus and Giessen had not complied with this limit for about ten years. Therefore, Chorus did not agree to the first draft of the contract. After further negotiations, the parties agreed on a limit of 35 servants, not 35 heads, per guild member (Council Petition June 13, 1709). This agreement meant that the number of apprenticed servants was

limited but the number of apprentices per guild member was no longer limited (Koch 1920, 81).

These events confirm the impression of a powerless legal system. A significant structural change occurred repeatedly. The entrepreneurial group subverted the legal framework and, again, former injustice became justice.

After renewed complaints by the domestic craftsmen induced by the still missing prevention of the relocation practice in 1711, the city council substantiated its regulations of 1696. The council declared that placing orders with non-domestic workers had been allowed only for needle numbers one and two. Merchant producers were to prioritize domestic craftsmen in the awarding of contracts for numbers one and two in economically difficult times (Council Minutes 8 January, 1711). Subsequently, the entrepreneurial group did not follow this edict, as was customary in Aachen. Furthermore, they extended the common practice of relocation. Sources prove that orders were placed with non-domestic workers up to needle number 15 for the year 1715 (Council Petition November 8, 1715). As a consequence, the business of the domestic craftsmen dwindled while production outside Aachen increased (Koch 1920, 83). Many apprenticed servants took advantage of this development. They migrated to areas beyond the territory of Aachen (Council Minutes 6 August, 1715). As Koch states, this was the coherent reaction because they did not have to pay guild fees there. Moreover, they might have been certain that they would get enough work from the merchants in their new home (Koch 1920, 83 et seq.). In this desperate situation, the council threatened the merchant producers with draconic penalties: if the merchants paid with goods rather than with money, the merchant producers would lose their citizenship (Council Minutes 15 November, 1715). That shows again the executive deficit of the legal system. Koch highlights that the leading merchant producers were aware that the council would never enforce such draconian penalties. Whenever the council inflicted a punishment, it repeatedly reversed the judgment afterwards (Koch 1920, 84).

In the face of escalation, the word "silence" best captures the essence of the relationship between the entrepreneurial group and domestic craftsmen in the 1720s. The class of merchant producers became enmeshed in extensive conflicts about their trademarks and guild elections. Each party had to satisfy his domestic craftsmen to prevent them from defecting to the opposing side. That was also true for the entrepreneurial group. After decades of exploitation and poverty, the domestic craftsmen enjoyed years of reprieve (Koch 1920, 95, 85-94). However, this hiatus from poverty and exploitation ended in 1730. After the merchant producers had settled their differences with the help of the city council, Chorus led the guild again and the entrepreneurial group could continue suspending regulation (Ibid., 95 et seq.). The result was the next act of a decades-long fight for primacy and assets in the needlemaking sector.

For decades, the domestic craftsmen never achieved a united line of action against suppression by the leading merchant producers. However, 75 craftsmen signed a petition in 1739 in which they criticized the well-known problems, especially underemployment and the common practice of relocation. In contrast, the entrepreneurial group complained about the increased competition from other production sites. Once again, the council tried to mediate, and negotiators from each party came together to find a way out. Cornelius Chorus assumed the function of negotiator for the leading merchant producers. Finally, the parties concluded a contract in August 1739, according to which the entrepreneurial group accepted a stop to relocation as long as the domestic craftsmen could provide a sufficient – and suitable – supply of needle blanks (Koch 1920, 95-8). After it became apparent that the group was not observing the agreement, the mayor of Aachen intervened and ordered the town-gate officials to confiscate exported wire and imported needles (Council Minutes September 11, 1739). The regulation became effective for the first time since 1693, leading to domestic craftsmen recovering slowly but surely. Their dependence on the leading merchant producers decreased, allowing them to exercise their political rights and, therefore, win the guild election (Koch 1920, 95-98).

The events of 1739 bring up an important question. As repeatedly mentioned, the former established structure that evolved in the 17th century had substantial deficits in the enforcement of any regulations. The investigated entrepreneurial group could launch new business practices and, due to their collaborative strategy to control the guild directorate, they were given carte blanche. How were the domestic craftsmen able to prevail again and, regarding relocation, to turn back the hands of time? Two factors seem to be critical. First, the domestic craftsmen were united for the first time. Before 1739, the entrepreneurial group knew how to drive a wedge between the different groups of domestic craftsmen. One can argue that the domestic craftsmen somehow learned from the entrepreneurial group that collective agency is a promising strategy. This new unity was a unique situation since the 1660s. Second, Chorus and his allies perhaps assumed that their approved method of ignoring regulations would work again and, once more, they accepted the regulations. For the umpteenth time, they proceeded to ignore them but, for the first time, this practice did not work. There is every indication that the entrepreneurial group had not planned on such magnitude of unity among the domestic craftsmen.

It becomes apparent that structural change did not inevitably mean that the formerly established structure had made way for an entirely different one. Certainly, the established structure lost ground during the change process and the leading merchant producers stabilized the new practice. However, both the newly emerging structure and the established structure overlap. Thus, it is possible for other actors (the domestic craftsmen in this particular case) to turn back the hands of time in the right circumstances.

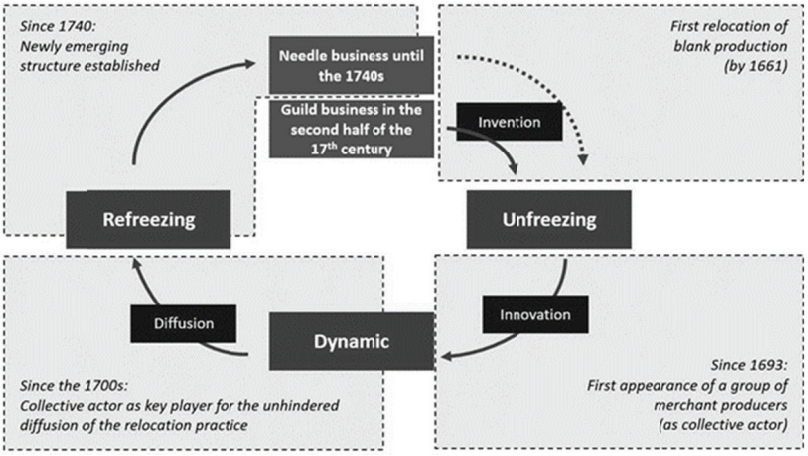
Nevertheless, there was more to come. Aachen's needlemaking sector looked back on decades of distinct economic relations with foreign territories, especially the Abbey of Burtscheid and the Duchy of Jülich, among others. Thus, this sudden compartmentalization led to serious effects on non-domestic workers. In the territory of Jülich alone, about 4,000 to 5,000 needlemakers were affected by unemployment (von Kempen 1913, 76 et seq.). This number suggests the sheer magnitude that the relocation practice had achieved by the 1730s. Subsequently, the Administration of the Electoral Palatinate in Düsseldorf protested against the lockout. In reaction to the city council's decision, the Electoral Palatinate prevented cereal deliveries to Aachen. The Imperial City of Aachen was dependent on trade routes that crossed the territory of the Electoral Palatinate. Therefore, the sanctions threatened the means of existence for Aachen. Therefore, the city council repealed its decision (Aagard 1987, 272; von Kempen 1913, 76; Koch 1920, 98). Subsequently, leading merchant producers and domestic craftsmen concluded an agreement in 1740 in which the merchants committed themselves to prioritizing domestic craftsmen on the condition that they supplied goods of quality. Unfortunately, the contract gave the merchant producers authority to assess such quality. Consequently, by 1740, the entrepreneurial group had recovered their hegemony (Koch 1920, 98). They successfully stabilized the new paradigm and the new structure refroze.

As it already became apparent during the unfreezing and dynamic phases, the entrepreneurial group initiated a momentum of change. The conflict between the Imperial City and the Electoral Palatinate reveals that the momentum led to another relevant effect: one could argue that only the successfully introduced relocation practice and its extensive effect on the economic development of foreign territories led to the Duke of Jülich's intervention.

3.5 A Collective Agency as Driver for Structural Change

In the last step, I integrate the findings of structure analysis and actor analysis into a compromised perspective. With the above mentioned decision of 1740, decades of power struggles ended.

Figure 5: Three-Phase Change Model, including Findings



Source: Author's own figure.

The former, guild-dominated structure in the second half of the 17th century had fundamentally changed. After the first reported relocation of blank production in 1661, the established structure successfully prevented this practice. In terms of the DRSC, one could argue that merchant producers' first attempt to enforce a new paradigm was prevented because the constraining forces of the established structure were still too strong. Thus, the resilience of the guild-dominated system did not boast any change until the late 17th century. As recently as the 1690s, the established structure began to unfreeze. Presumably, the appearance of a cooperating entrepreneurial group was the crucial factor for the beginning of the unfreezing phase. Solely as a cooperative actor, the entrepreneurial group could keep the guild directorate under their control and suspend regulation. They initiated a phase of increasing relocation, as the actor analysis indicates, by stealthily exploiting the weaknesses of the established structure. In a stop-go process, the relocation of needle blank production became increasingly common practice. Again, the crucial factor for the successful diffusion of the relocation practice was an (increasingly integrated and finite) entrepreneurial group. They initiated a momentum by introducing the relocation of blank production as an innovative business strategy. In consequence, their businesses increased and they achieved a dominant position compared with other local merchants and domestic craftsmen. Thus, the investigated entrepreneurial group had the financial resources to follow a collaborative strategy for suspending any regulation by controlling the guild directorate.

To illustrate the particular structural change, Table 3 contrasts the characteristics of the initial structure with the terminal structure of the investigation

period. To recapitulate, "structural conditions" describe the particular circumstances under which merchant producers operate their business.

In terms of political-legal conditions, strict regulation turned into the de facto liberalization of the labor market and workshop growth. Moreover, the increasing support from foreign authorities against regulatory policy extenuated the enforcement of the relocation practice against resistance by the established structure.

Table 3: Enabling and Constraining Factors after 1740

Structural conditions	Enabling factors	Constraining factors
Technological conditions	– application of predominant technology (steel wire) – application of water-powered scouring tables with resulting efficiency gain for merchant producers	
Political-legal conditions	– no/weak executive agency – participation through active and passive electoral rights – *de facto political hegemony* – *de facto repealed regulation (growth of workshops, job relocation, market access)* – *support from foreign authorities against regulatory policy*	~~– strict regulation (growth of workshops, job relocation, market access)~~
Economic conditions	– available water resources – dominant market position – immediate access to continental trade routes – oversupply of experienced laborers – *access to low-wage labor markets outside Aachen*	~~– high labor costs (high living costs comparing to rural areas, nonwage costs)~~
Societal conditions	– traditionally prevalent and institutionally secured knowledge and skills – *social division between formerly equal master craftsmen into (1) a group of well-funded largescale manufacturers and (2) a group of dependent wage-workers*	

In terms of economic conditions, the change process opened up access to low-wage labor markets. This liberalization led to a significant reduction in labor costs for the merchant producers. Furthermore, the competition with non-domestic needlemakers intensified the pressure on domestic craftsmen to work for less money.

In terms of societal conditions, the former de jure and – presumably – nearly de facto equal relationship between the merchant producers and the domestic

craftsmen was replaced by de facto fundamental social division. The resulting existence-threatening poverty of the domestic craftsmen was devastating for social cohesion in the needlemaking business.

4. Conclusion

To summarize the major findings of this paper and to discuss its methodological implications, I return to the purpose of this article, which was to explain the emergence of a new practice (i.e., relocation) and the role of entrepreneurial groups therein, based on the preindustrial case of the German needle industry. I discussed the concept of IE and, to overcome its shortcomings, I integrated TCM and SAC. In doing so, I aimed to find a method that may allow the reciprocal interdependency between entrepreneurial groups as collective actors and the established and emerging structures to be described. The guiding research question was: How does an entrepreneurial group change industrial structures through the application of innovative business strategies?

I have shown how smartly the investigated group of merchant producers used their advantage over the domestic craftsmen to leverage the weaknesses of the established structure and to enforce their own interests. The introduced structural factors help to describe the effect of structural conditions on the space for entrepreneurial maneuvers holistically and differentiatedly. The actor analysis revealed that the collaboration of the investigated entrepreneurial group was by no means methodless or intuitive. They decided to exceed the possibility space. In contrast, the remaining merchants decided to act within the scope of the established structure. The group precisely aimed for the Achilles' heel of the established guild-regulated structure and initiated a change process in which the established structure became replaced by the emerging structure in an incremental process. Therefore, I have shown that there is an overlap of the established and the emerging structures. Accordingly, the established structure diminished phase by phase.

However, the investigated entrepreneurial group was a key player in the successful diffusion of the relocation practice. The group collaborated in the guild directorate to suspend regulation. But neither innovative agency nor the weaknesses of the established structure were solely responsible for the delineated change. The group rather initiated a momentum by introducing the relocation of blank production as a new practice. Consequentially, they first benefitted from the resulting financial resources, which they needed in order to control the domestic craftsmen, to suspend regulation, and to react against the resistance of the established structure in the long run. Second, they benefitted from the political involvement of foreign authorities. As became apparent, solely economic effects of relocation on needlemakers beyond the territory of Aachen and the resulting intervention of foreign authorities finally stabilized

the new emerging paradigm. To put it in the words of Weik, the success in overcoming regulation and establishing the new practice of relocation was by no means a "success in a linear timeline" (2011, 472). Rather, the emergence of the new practice was rich in interdependencies between structure and agency.

This leads to the methodological implication: the article could show that the integration of TCM and ASC contributes to overcoming IE's shortcomings. First, the integrated approach helps to widen the focus from how some actors, rather than others, become institutional entrepreneurs across to (external) interaction of entrepreneurial groups with the established structure. Second, the DRSC may contribute to overcoming the reductionist perspective of IE on "success in a linear timeline" (Weik 2011, 472) by explaining change process as a dynamic-reciprocal process of interdependencies between agency and structure.

Certainly, there remain unanswered questions. The strengths are weaknesses as well. On the one hand, the DRSC overcomes the reductionist perspective. On the other hand, it does not explain intrapersonal factors of agency such as "habit, imagination, and judgment" (Garud et al. 2007, 561) and their impact on an actor's decision to act within the scope of the possibility space or to exceed it. For the given case, this methodological deficit is bearable, as there are no sources (such as ego-documents) which could help us to learn more about the motivation and the individual predisposing of the entrepreneurial group. Further applications of the DRSC may aim to improve the model by using concepts capturing those intrapersonal perspectives, which the field of IE is so rich in. Moreover, it may be relevant to broaden the DRSC by using a multi-actor perspective. In this study, I focused only on a particular class of actors (merchants) and their reciprocal interrelationship with structure. Remember, the possibility space is delineated actor-specifically. Further studies could also examine other classes of actors (e.g., domestic craftsmen) and their interrelationship with structure. In doing so, one could discuss the actors' behavior both under particular structural circumstances and within an actor-network.

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